

STIC SEARCH

HERTZOG 10/516,372

Page 1

=> file reg

FILE 'REGISTRY' ENTERED AT 14:25:04 ON 09 NOV 2005
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FILE 'REGISTRY' ENTERED AT 14:05:13 ON 09 NOV 2005
E VANADYL SULFATE/CN

L1 7 S E7-E13
E VANADIUM TRIOXIDE/CN
L2 1 S E3
E SULFURIC ACID/CN
L3 1 S E3

FILE 'HCA' ENTERED AT 14:12:49 ON 09 NOV 2005

L4 2601 S L1 OR VANADYL#(W) (SULFATE# OR SULPHATE#) OR VOSO4 OR VO
L5 3941 S L2 OR (VANADIUM# OR DIVANADIUM# OR V) (W) TRIOXIDE# OR V2
L6 417499 S L3 OR (SULFURIC# OR SULFERIC# OR SULPHURIC# OR SULPHERI
L7 18 S L4 AND L5 AND L6
L8 QUE OXIDN# OR OXIDA? OR OXIDI?

FILE 'REGISTRY' ENTERED AT 14:15:15 ON 09 NOV 2005
E HYDROGEN PEROXIDE/CN

L9 1 S E3

FILE 'HCA' ENTERED AT 14:16:08 ON 09 NOV 2005

L10 183668 S L9 OR HYDROGEN#(A) PEROXIDE# OR H2O2

FILE 'REGISTRY' ENTERED AT 14:16:11 ON 09 NOV 2005
E SODIUM PEROXIDE/CN

L11 1 S E3
E POTASSIUM PERMANGANATE/CN
L12 1 S E3
E IODINE/CN
L13 1 S E3
E POTASSIUM IODATE/CN
L14 1 S E3
E POTASSIUM BROMATE/CN
L15 1 S E3
E BROMINE/CN
L16 1 S E3
E AMMONIUM PERSULFATE/CN
L17 1 S E3

L18 E SODIUM PERSULFATE/CN
 3 S E3
 E POTASSIUM PERSULFATE/CN
 L19 1 S E3
 E CERIUM SULFATE/CN
 L20 2 S E3
 E POTASSIUM DICHROMATE/CN
 L21 1 S E3
 L22 14 S L11-L21

FILE 'HCA' ENTERED AT 14:21:06 ON 09 NOV 2005
 L23 116257 S L22
 L24 2 S L7 AND (L10 OR L23)
 L25 16 S L7 NOT L24

=> file hca
 FILE 'HCA' ENTERED AT 14:25:10 ON 09 NOV 2005
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=> d 124 1-2 ibib abs hitstr hitind

L24 ANSWER 1 OF 2 HCA COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 140:18013 HCA
 TITLE: Process for the preparation of **vanadyl sulfate** solution
 INVENTOR(S): Dormehl, Andries Gerhardus; Monaghan, Patrick Albert
 PATENT ASSIGNEE(S): Highveld Steel and Vanadium Corporation Limited,
 S. Afr.
 SOURCE: PCT Int. Appl., 10 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

(this case)

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2003101893	A1	20031211	WO 2003-IB2002	200305 26

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,
 CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,
 GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,
 LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
 NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SI, SK, SL,
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 NE, SN, TD, TG

CA 2487956 AA 20031211 CA 2003-2487956
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EP 1511691 A1 20050309 EP 2003-756074
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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
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JP 2005528314 T2 20050922 JP 2004-509591
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US 2005220898 A1 20051006 US 2005-516372
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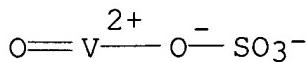
PRIORITY APPLN. INFO.: ZA 2002-4382 A
 200205
 31

WO 2003-IB2002 W
 200305
 26

AB A process for producing a **vanadyl sulfate** soln.
 comprises forming a suspension of **vanadium trioxide** in a **sulfuric acid** soln. and
 contacting the suspension with a strong oxidizing agent under
 controlled conditions to produce the **vanadyl sulfate** soln. A preferred oxidizing agent is
hydrogen peroxide, which is added slowly to the
 suspension due to the violent nature of the reaction.

IT 27774-13-6P, **Vanadyl sulfate**
 (prepn. of **vanadyl sulfate** soln. from
vanadium trioxide)

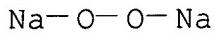
RN 27774-13-6 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1313-60-6**, Sodium peroxide **1314-34-7**,
Vanadium trioxide **7553-56-2**, Iodine,
 reactions **7664-93-9**, **Sulfuric acid**,
 reactions **7722-64-7**, Potassium permanganate
7722-84-1, **Hydrogen peroxide**, reactions
7726-95-6, Bromine, reactions **7727-21-1**, Potassium
 persulfate **7727-54-0**, Ammonium persulfate
7758-01-2, Potassium bromate **7758-05-6**, Potassium
 iodate **7775-27-1**, Sodium persulfate **7778-50-9**,
 Potassium dichromate
 (prepn. of **vanadyl sulfate** soln. from
vanadium trioxide)

RN 1313-60-6 HCA

CN Sodium peroxide (Na₂O₂) (8CI, 9CI) (CA INDEX NAME)



RN 1314-34-7 HCA

CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

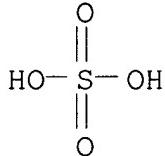
RN 7553-56-2 HCA

CN Iodine (8CI, 9CI) (CA INDEX NAME)



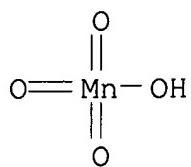
RN 7664-93-9 HCA

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



RN 7722-64-7 HCA

CN Permanganic acid (HMnO₄), potassium salt (8CI, 9CI) (CA INDEX NAME)



● K

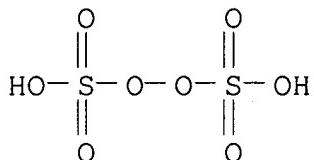
RN 7722-84-1 HCA
CN Hydrogen peroxide (H₂O₂) (9CI) (CA INDEX NAME)

HO—OH

RN 7726-95-6 HCA
CN Bromine (8CI, 9CI) (CA INDEX NAME)

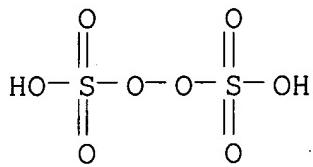
Br—Br

RN 7727-21-1 HCA
CN Peroxydisulfuric acid ([(HO)S(O)₂]₂O₂), dipotassium salt (9CI) (CA INDEX NAME)



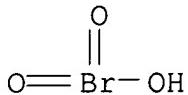
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RN 7727-54-0 HCA
CN Peroxydisulfuric acid ([(HO)S(O)₂]₂O₂), diammonium salt (8CI, 9CI) (CA INDEX NAME)



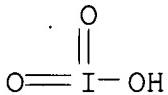
● 2 NH₃

RN 7758-01-2 HCA
CN Bromic acid, potassium salt (8CI, 9CI) (CA INDEX NAME)



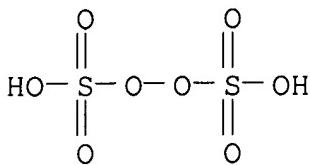
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RN 7758-05-6 HCA
CN Iodic acid (HIO₃), potassium salt (8CI, 9CI) (CA INDEX NAME)



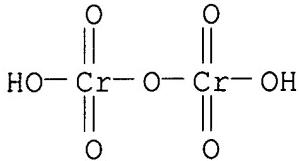
● K

RN 7775-27-1 HCA
CN Peroxydisulfuric acid ([(HO)S(O)₂]₂O₂), disodium salt (8CI, 9CI) (CA INDEX NAME)



●2 Na

RN 7778-50-9 HCA
 CN Chromic acid ($\text{H}_2\text{Cr}_2\text{O}_7$), dipotassium salt (9CI) (CA INDEX NAME)



●2 K

IC ICM C01G031-02
 CC 49-5 (Industrial Inorganic Chemicals)
 ST safety **vanadyl sulfate** prepn **vanadium trioxide** oxidn
 IT Occupational safety
 (prepn. of **vanadyl sulfate** soln. from
 vanadium trioxide)
 IT 27774-13-6P, **Vanadyl sulfate**
 (prepn. of **vanadyl sulfate** soln. from
 vanadium trioxide)
 IT 1313-60-6, Sodium peroxide 1314-34-7,
 Vanadium trioxide 7553-56-2, Iodine,
 reactions 7664-93-9, **Sulfuric acid**,
 reactions 7722-64-7, Potassium permanganate
 7722-84-1, **Hydrogen peroxide**, reactions
 7726-95-6, Bromine, reactions 7727-21-1, Potassium
 persulfate 7727-54-0, Ammonium persulfate
 7758-01-2, Potassium bromate 7758-05-6, Potassium
 iodate 7775-27-1, Sodium persulfate 7778-50-9,
 Potassium dichromate 21367-17-9, **Sulfuric acid**
 , cerium(4+) salt
 (prepn. of **vanadyl sulfate** soln. from

vanadium trioxide)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L24 ANSWER 2 OF 2 HCA COPYRIGHT 2005 ACS on STN
 ACCESSION NUMBER: 116:135528 HCA
 TITLE: Performance-oriented packaging standards; changes to classification, hazard communication, packaging and handling requirements based on UN standards and agency initiative
 CORPORATE SOURCE: United States Dept. of Transportation, Washington, DC, 20590-0001, USA
 SOURCE: Federal Register (1990), 55(246), 52402-729, 21 Dec 1990
 DOCUMENT TYPE: CODEN: FEREAC; ISSN: 0097-6326
 LANGUAGE: Journal English

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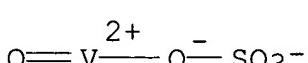
L25 ANSWER 1 OF 16 HCA COPYRIGHT 2005 ACS on STN
 142:484739 Process for preparing **vanadyl sulfate** and use. Li, Linde; Chen, Housheng (Iron & Steel Research Inst., Panzhihua Iron & Steel Co., Ltd., Peop. Rep. China). Faming Zhanli Shengqing Gongkai Shuomingshu CN 1491898 A 20040428, No pp. given (Chinese). CODEN: CNXXEV. APPLICATION: CN 2002-133808 20020925.

AB The prepn. process of **vanadyl sulfate** includes adding **V₂O₃** and V₂O₅ into **sulfuric acid**, filtering and evapg. the filtrate, eliminating cryst. water to obtain light blue **VOSO₄** powder. Compared with available technol. path, the said technol. process of the present invention has less steps, mild reaction condition, simple technol. process, low cost and stable product quality. The filtrate may be used as the material as electrolyte in vanadium cell.

IT **27774-13-6P, Vanadyl sulfate (VOSO₄)**
 (synthesis and use as battery electrolyte)

RN 27774-13-6 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7, Vanadium oxide (V₂O₃)**

(synthesis of **vanadyl sulfate** from)

RN 1314-34-7 HCA

CN Vanadium oxide (V2O3) (8CI, 9CI) (CA INDEX NAME)

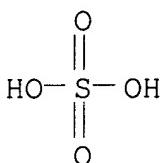
*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **7664-93-9, Sulfuric acid, reactions**

(synthesis of **vanadyl sulfate** from vanadium oxides and)

RN 7664-93-9 HCA

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT **27774-13-6P, Vanadyl sulfate (VOSO4)**

(synthesis and use as battery electrolyte)

IT **1314-34-7, Vanadium oxide (V2O3)**

(synthesis of **vanadyl sulfate** from)

IT **7664-93-9, Sulfuric acid, reactions**

(synthesis of **vanadyl sulfate** from vanadium oxides and)

L25 ANSWER 2 OF 16 HCA COPYRIGHT 2005 ACS on STN

136:104679 Process for the preparation of a **vanadyl**

(1,4x9) **sulfate** solution with a specified molar concentration.

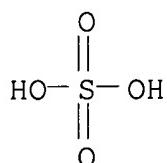
Rohrmann, Bodo Rudiger; Dormehl, Andries Gerardus (Highveld Steel and Vanadium Corporation Limited, S. Afr.). PCT Int. Appl. WO 2002004353 A2 20020117, 8 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-IB1203 20010706. PRIORITY: ZA 2000-3491 20000712.

AB A process is disclosed for the prepn. of a **vanadyl** **sulfate** soln. with a specified molar concn. from a first starting material contg. V2O5 and a second starting material contg. V2O3. The first and second starting materials are mixed together in amts. such that there are substantially equal quantities of vanadium in the first and second starting materials. A predetd. vol. of a **sulfuric acid** soln. having a predetd.

molar concn. is added to produce a **VOSO₄** soln. having the specified molar concn.

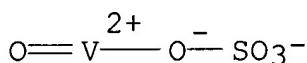
IT **1314-34-7, Vanadium trioxide**
7664-93-9, Sulfuric acid, processes
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)

RN 1314-34-7 HCA
 CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)
 *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
 RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT **27774-13-6P, Vanadyl sulfate**
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)

RN 27774-13-6 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7, Vanadium trioxide**
7664-93-9, Sulfuric acid, processes
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)

IT **27774-13-6P, Vanadyl sulfate**
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)

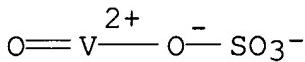
L25 ANSWER 3 OF 16 HCA COPYRIGHT 2005 ACS on STN

136:78855 Inorganic-organic hybrids derived from oxovanadium sulfate motifs: synthesis and characterization of [VIVO(.mu.3-SO₄)(2,2'-bpy)].infin.. Khan, M. Ishaque; Cevik, Sabri; Doedens, Robert J. (Department of Biological, Chemical, and Physical Sciences, Illinois Institute of Technology, Chicago, IL, 60616, USA). Chemical Communications (Cambridge, United Kingdom) (19), 1930-1931 (English) 2001. CODEN: CHCOFS. ISSN: 1359-7345. OTHER SOURCES: CASREACT 136:78855. Publisher: Royal Society of Chemistry.

AB The hydrothermal reaction of V₂O₅, **V2O₃**, 2,2'-bpy and Na₂SO₄ in dil. **H₂SO₄** yields a novel hybrid,

[VIVO(.mu.3-SO₄)(2,2'-bpy)].infin., which demonstrates the potential of constructing a new class of robust composite solids composed of a {V/O/SO₄}-based framework decorated with org. functionalities by combining appropriate **vanadyl sulfate** motifs with a variety of org. ligands.

- L25 ANSWER 4 OF 16 HCA COPYRIGHT 2005 ACS on STN
 128:310545 Manufacture of vanadium compound electrolyte solutions for redox flow batteries. Makiyama, Ikuo; Ono, Hiroaki; Tada, Shunji; Asai, Junji (Taiyo Mining and Industrial Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 10125345 A2 19980515 Heisei, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1996-299604 19961023.
 AB The **VOSO₄** electrolyte solns. are prep'd by heating a V oxide (V₂O₅ or V₆O₁₃ based) starting material in a reducing atm. to reduce the oxide to a **V₂O₃** based oxide, dissolving equal mols of V₂O₅ and **V₂O₃** in the reduced oxide with **H₂SO₄** after dispersing the oxides in water. The starting oxide may be obtained by thermally decompg. NH₄VO₃ in a sealed container.
 IT **27774-13-6P**, Vanadium oxide sulfate (**VOSO₄**)
 (manuf. of vanadium oxide sulfate electrolyte solns. for redox flow batteries)
 RN 27774-13-6 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



- IT **27774-13-6P**, Vanadium oxide sulfate (**VOSO₄**)
 (manuf. of vanadium oxide sulfate electrolyte solns. for redox flow batteries)

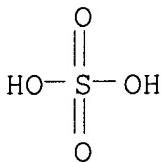
- L25 ANSWER 5 OF 16 HCA COPYRIGHT 2005 ACS on STN
 110:78735 Recovery of vanadium pentoxide from spent catalysts. Seon, Francoise; Ries, Michel (Rhone-Poulenc Chimie SA, Fr.). Eur. Pat. Appl. EP 290308 A1 19881109, 5 pp. DESIGNATED STATES: R: AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE. (French). CODEN: EPXXDW. APPLICATION: EP 1988-400954 19880420. PRIORITY: FR 1987-6089 19870429.
 AB The title process consists of treating an aq. suspension of the spent catalyst, e.g., from **H₂SO₄** manuf., with a gas mixt. contg. 5-20 wt.% SO₂ and 10-30 wt.% O, dild. with an inert gas, e.g., N. The gas may be waste gas from the combustion zone of a **H₂SO₄**-prodn. facility, and the stoichiometric amt. of SO₂ for redn. of the V content of the catalyst is used. Thus, 600 g SO₂ oxidn. catalyst of compn. V₂O₅ 7.5, K₂O 11.7, SO₄ 25.8, Na 1.2, Al 0.15, and Fe 0.015 wt.%, supported on SiO₂, was ground and dispersed

in 375 mL water. The suspension was treated with a gas stream of compn. SO₂ 17, O₂ 17, and N₂ 66 wt.% for 1 h at ambient temp. for SO₂/V₂O₃ ratio 1.0:1.0. The suspension was then filtered to give a soln. of (VO)₂(SO₄)₃ contg. 62 g/L V (as V₂O₅). The filter cake was washed 3 times with water, which was added to the filtrate for 95% recovery of the V, a value comparable to that obtained when pure SO₂ was used to treat the catalyst.

IT **7664-93-9P, Sulfuric acid, preparation**
 (waste gas from manuf. of, in vanadium recovery from spent catalysts)

RN 7664-93-9 HCA

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT **7664-93-9P, Sulfuric acid, preparation**
 (waste gas from manuf. of, in vanadium recovery from spent catalysts)

L25 ANSWER 6 OF 16 HCA COPYRIGHT 2005 ACS on STN

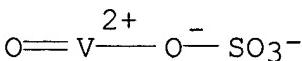
88:44277 Preparation and study of vanadium(V) sulfates. Tudo, Joseph; Laplace, Gerard (Inst. Univ. Technol. Amiens, Amiens, Fr.). Revue de Chimie Minerale, 14(4), 404-17 (French) 1977. CODEN: RVCMA8. ISSN: 0035-1032.

AB The reactions between V₂O₅ and H₂SO₄ or oleums at various temps. gave VO₂(HSO₄)₂, VO₂(HSO₄)₂, V₂O₃(HSO₄)₄, VO(OH)(HSO₄)₂, (H₃O)(VO)(SO₄)₂, V₂O₃(SO₄)₂, and V₂O₃(SO₄)₂.2H₂O. DTA and thermogravimetric curves indicate that V₂O₃(SO₄)₂ has the highest stability of all the compds. The solid-state redn. of V₂O₃(SO₄)₂ by H₂, SO₂, or H₂S gave a new crystal form, .gamma.-VOSO₄.

IT **27774-13-6P**
 (prepn. of .gamma.-, by redn. of **divanadium trioxide disulfate**)

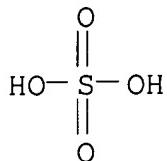
RN 27774-13-6 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **7664-93-9, reactions**
 (reaction of, with vanadium pentoxide)

RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



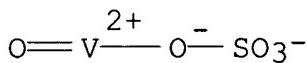
IT **27774-13-6P**
 (prepn. of .gamma.-, by redn. of **divanadium trioxide disulfate**)
 IT **7664-93-9**, reactions
 (reaction of, with vanadium pentoxide)

L25 ANSWER 7 OF 16 HCA COPYRIGHT 2005 ACS on STN
 76:93947 Double sulfates of vanadyl and ammonium. Tudo, Joseph; Tudo, Michele; Laplace, Gerard (Inst. Univ. Technol. Amiens, Amiens, Fr.). Revue de Chimie Minerale, 8(6), 841-50 (French) 1971. CODEN: RVCMA8. ISSN: 0035-1032.

AB An aq. soln. contg. **VOSO4** and $(\text{NH}_4)_2\text{SO}_4$ was concd. to a syrup which was triturated with alc. and ether and the solid was dried and washed with H_2O to give **VOSO4**. $(\text{NH}_4)_2\text{SO}_4 \cdot 3\text{H}_2\text{O}$. The trihydrate was heated under O at 60.degree./hr to give the monohydrate at 80-116.degree.; the anhyd. salt was obtained at 220.degree.. X-ray powder data for the 2 dehydration products are tabulated. The product formed at 130.degree. was probably **VOSO4**. $(\text{NH}_4)_2\text{SO}_4 \cdot 0.25 \text{H}_2\text{O}$. The anhyd. salt was heated under O at 30.degree./hr to give successively $2\text{VOSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4$ (contg. some $\text{V}_2(\text{SO}_4)_3 \cdot (\text{NH}_4)_2\text{SO}_4$), **2VOSO4.H2SO4**, .alpha.-**VOSO4**, and finally V_2O_5 . When **VOSO4**. $(\text{NH}_4)_2\text{SO}_4$ was heated from 220 to 400.degree. under a H atm., the final phase was **V2O3**.

IT **27774-13-6P**
 (formation and thermal decompn. of .alpha.-)

RN 27774-13-6 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7P**
 (formation of, in thermal decompn. of ammonium **vanadyl sulfates**)
 RN 1314-34-7 HCA
 CN Vanadium oxide (V_2O_3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **27774-13-6P**

(formation and thermal decompn. of .alpha.-)

IT **1314-34-7P**

(formation of, in thermal decompn. of ammonium **vanadyl sulfates**)

L25 ANSWER 8 OF 16 HCA COPYRIGHT 2005 ACS on STN

72:38410 Preparation and study of vanadium(V) sulfates: V2O5.2SO₃ and V2O5.4SO₃.3H₂O. Tudo, Joseph; Jolibois, Bernard; Laplace, Gerard (Lab. Chim. Miner., Fac. Sci., Amiens, Fr.). Comptes Rendus des Seances de l'Academie des Sciences, Serie C: Sciences Chimiques, 269(17), 978-80 (French) 1969. CODEN: CHDCAQ. ISSN: 0567-6541.

AB If a soln. of V₂O₅ in concd. **H₂SO₄** is heated at 200.degree., V₂O₅.-2SO₃ is obtained, while V₂O₅.4SO₃.3H₂O ppts. if the temp. is held at 120.degree.. By heating under dry O, V₂O₅.2SO₃ starts to decomp. at 360.degree., giving V₂O₅ directly at .apprx.450.degree.. The redn. of V₂O₅.2SO₃ by pure dry H occurs in 2 steps: at 250-330.degree. the disulfate decompns. to **vanadyl sulfate** which then transforms starting at 360.degree. to give **V₂O₃** at 400.degree.. When heated under dry O, V₂O₅.-2SO₃.2H₂O, formed by exposure of the anhyd. salt to moist air, loses its H₂O mols. starting at 140.degree. to give the anhyd. salt at 250.degree., without an intermediate hydrate. When V₂O₅.4SO₃.3H₂O is heated under dry O, it starts to decomp. at 160.degree. and forms the disulfate at 230.degree.. X-ray diffraction results are presented.

L25 ANSWER 9 OF 16 HCA COPYRIGHT 2005 ACS on STN

71:73779 Removing sulfur oxides from gases. Raman, Anantha K. S. (Esso Research and Engineering Co.). U.S. US 3454356 19690708, 4 pp. (English). CODEN: USXXAM. APPLICATION: US 1966-564198 19660711.

AB Waste gases contg. SO₂ are passed over **V₂O₃** or V₂O₄ or their mixts. at 750-1000.degree.F. The SO₂ reacts with O normally present to form SO₃ which reacts in turn with the **V₂O₃-V₂O₄** to form **VOSO₄**. Regeneration is effected at 1000-1200.degree.F. in presence of SO₂ according to the reaction 2VOSO₄ .fwdarw. V₂O₄ + 2SO₃, and the SO₃ is recovered as by-product **H₂SO₄**. Other oxide coabsorbents (CuO, NiO, Fe₂O₃, ZnO, Al₂O₃, or their mixts.) may be used to supplement the **V₂O₃-V₂O₄**.

IT **1314-34-7**

(sulfur dioxide removal from gas by reaction with)

RN 1314-34-7 HCA

CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **1314-34-7**

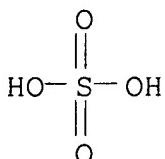
(sulfur dioxide removal from gas by reaction with)

L25 ANSWER 10 OF 16 HCA COPYRIGHT 2005 ACS on STN
 64:98215 Original Reference No. 64:18492a-c The **sulfuric acid** solvent system. VII. Solutions of some tin(IV) and lead(IV) compounds. Gillespie, R. J.; Kapoor, R.; Robinson, E. A. (McMaster Univ., Hamilton). Canadian Journal of Chemistry, 44(10), 1197-202 (English) 1966. CODEN: CJCHAG. ISSN: 0008-4042.
 AB cf. CA 60, 15201e. Solns. of Me₄Sn, trimethyltin sulfate, Bu₂Sn(OAc)₂, Ph₄Sn, and triphenyltin hydroxide in 100% **H₂SO₄** were investigated by cryoscopic and conductimetric methods. Me₄Sn reacts with **H₂SO₄** with the evolution of CH₄ and the formation of trimethyltin hydrogen sulfate. Trialkyltin hydrogen sulfates and dialkyltin bis(hydrogen sulfates) behave as strong bases. It is probable that the cationic species formed are protonated hydrogen sulfates rather than "stannonium" ions. Ph-substituted Sn compds. are cleaved in **H₂SO₄** with the formation of benzenesulfonic acid and H₂Sn(HSO₄)₆ and its anions. Pb(OAc)₄ gives yellow solns. contg. H₂Pb(HSO₄)₆ and its anions.

IT **7664-93-9, Sulfuric acid**
 (soln. in, of P compds. and V compds., cryoscopy, elec. cond. and ionization of)

RN 7664-93-9 HCA

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



(soln. in, of Pb(IV) and Sn(IV) compds., H sulfato complex formation in

IT **7664-93-9, Sulfuric acid**
 (soln. in, of P compds. and V compds., cryoscopy, elec. cond. and ionization of)

IT **7664-93-9, Sulfuric acid**
 (soln. in, of Pb(IV) and Sn(IV) compds., H sulfato complex formation in)

L25 ANSWER 11 OF 16 HCA COPYRIGHT 2005 ACS on STN

63:69073 Original Reference No. 63:12668g-h,12669a **vanadyl sulfate** and its reduction by hydrogen sulfide: vanadium sulfides. Tudo, Joseph (Fac. Sci., Lille, Fr.). Rev. Chim. Minerale, 2(1), 58-117 (French) 1965.

AB **VOSO₄.6H₂O** is prep'd. by evapn. of a soln. contg. 1 mol V₂O₅/mol **H₂SO₄** after redn. with H₂S. **VOSO₄.3H₂O** is obtained at lower acid concn. Hydrates contg. 5, 4, 3, and 1 H₂O

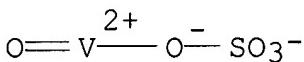
are prep'd. by heating **VOSO₄**.6H₂O. The vapor pressures of the 6, 5, 4, and 3 hydrates at 30.degree. are 3.4, 3.2, 2.6, and 2.3 mm. **VOSO₄**.3H₂O decomp. at 93.degree. to **VOSO₄**.H₂O. **VOSO₄** is prep'd. from any hydrate at 330.degree.. It crystallizes in the tetragonal system with 2 mols./unit cell, (a = 6.27, c = 4.12 A.). Oxidn. in O at 550.degree. yields V₂O₅. V₆O₁₃ is prep'd. at 0.1 mm. and 550.degree.. At lower pressures and higher temps. V₂O₄ is formed. Heating **VOSO₄** in N yields a mixt. of V₂O₅ and V₆O₁₃. Redn. by H at 440.degree. gives **V₂O₃**. Heating in SO₂ gives V₂O₄. **VOSO₄** is reduced quant. at 280.degree. by H₂S to give VS₄. VS₄ in vacuo at 450.degree. gives V₂S₃. Oxidn. of VS₄ with O at 165.degree. gives V₂O₄ and **VOSO₄**. V₂S₃ is reduced by H at 600-720.degree. to V₄S₅(compr. VS_{1.19} to VS_{1.34}), and at 1000.degree. to VS. The lower V sulfides readily absorb O at 100.degree.. Phases of approx. comp. V₂O_{0.25}, V₂O_{0.5}, VS_{1.2500.25}, VS_{1.2500.75}, and VS_{1.500.5}, stable at 240, 270, 190, 310, and 310.degree., resp., are formed. VS_{1.2500.75} gives VS when heated in vacuo at 370.degree..

IT **12439-96-2, Vanadyl sulfate,**
VOSO₄, pentahydrate **12440-03-8, Vanadyl sulfate,** **VOSO₄**, monohydrate **19126-73-9,**
Vanadyl sulfate, VOSO₄, hexahydrate
41756-89-2, Vanadyl sulfate,
VOSO₄, trihydrate

(decompn., oxidn. and redn. of)

RN 12439-96-2 HCA

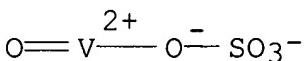
CN Vanadium, oxo[sulfato(2-)-.kappa.O]-, pentahydrate (9CI) (CA INDEX NAME)



● 5 H₂O

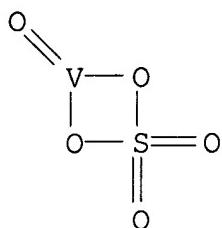
RN 12440-03-8 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]-, monohydrate (9CI) (CA INDEX NAME)



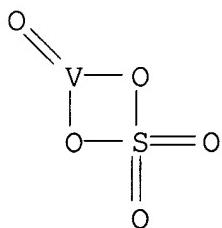
● H₂O

RN 19126-73-9 HCA
 CN Vanadium, oxo[sulfato(2-)-O,O']-, hexahydrate (9CI) (CA INDEX NAME)



● 6 H₂O

RN 41756-89-2 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O,.kappa.O']-, trihydrate (9CI)
 (CA INDEX NAME)



● 3 H₂O

IT 1314-34-7, Vanadium oxide, V2O3
 (formation of, from VOSO₄ oxidn. and subsequent redn.)

RN 1314-34-7 HCA
 CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT 12439-96-2, Vanadyl sulfate,
 VOSO₄, pentahydrate 12440-03-8, Vanadyl
 sulfate, VOSO₄, monohydrate 19126-73-9,
 Vanadyl sulfate, VOSO₄, hexahydrate
 41756-89-2, Vanadyl sulfate,
 VOSO₄, trihydrate

(decompn., oxidn. and redn. of)

IT 1314-34-7, Vanadium oxide, V₂O₃
 (formation of, from VOSO₄ oxidn. and subsequent redn.)

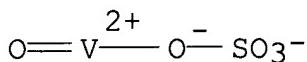
L25 ANSWER 12 OF 16 HCA COPYRIGHT 2005 ACS on STN
 58:69796 Original Reference No. 58:11945g-h The determination of oxidizing and reducing cations in transition metal oxides using vanadium sulfate solutions. Wickham, D. G.; Whipple, E. R. (Ampex Computer Prods. Co., Culver City, CA). Talanta, 10, 314-15 (English) 1963. CODEN: TLNTA2. ISSN: 0039-9140.

AB Since V sulfate solns. are very stable, they are useful anal. reagents. A soln. contg. V(V) in dil. **H₂SO₄** can be used to det. Fe(II), Ti(III), and V(III) in solid oxides by titrating the resulting V(IV) with KMnO₄. A similar soln. of **VOSO₄** can be used to det. Co(III), Mn(III), and Mn(IV) by titrating excess reagent with KMnO₄. The method is valuable in studies of ferrites.

IT **27774-13-6, Vanadyl sulfate,**
VOSO₄
 (in analysis)

RN 27774-13-6 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7, Vanadium oxide, V₂O₃**
 (vanadium detn. in)

RN 1314-34-7 HCA

CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **27774-13-6, Vanadyl sulfate,**
VOSO₄
 (in analysis)

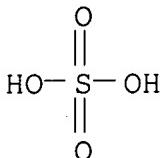
IT **1314-34-7, Vanadium oxide, V₂O₃**
 (vanadium detn. in)

L25 ANSWER 13 OF 16 HCA COPYRIGHT 2005 ACS on STN
 30:17714 Original Reference No. 30:2329f-g Is sintering a primary cause of lowered activity of vanadium-barium catalysts?. Adadurov, I. E. Ukrains'kii Khemichnii Zhurnal, 10(Wiss.-tech. Teil), 336-45 (Russian) 1935. CODEN: UKHZAS. ISSN: 0372-4190.

AB cf. C. A. 29, 6371.6,6371.7. Metallographic examn. of several samples of partly vitrified V-Ba zeolite catalysts, used in a **H₂SO₄** contact process, disclosed that their reduced activity is caused not only by the adsorption of SO₃ on the surface, but also by the gradual decomprn. of the complex with the sepn. of V₂O₅, SiO₂, BaO and alkali oxides. V₂O₅ is reduced by SO₂ to **V₂O₃** and **VOSO₄** which escape from the contact space. Under the thermal conditions of the contact process, BaO combines with SiO₂ with the formation of stable silicates. This reaction is

accelerated at 575.degree. and higher temps. by the conversion of .beta.-SiO₂ to a highly reactive .alpha.-SiO₂.

IT 7664-93-9, **Sulfuric acid**
 (manuf. of, catalysts contg. Ba and V in, effect of sintering on)
 RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT 7664-93-9, **Sulfuric acid**
 (manuf. of, catalysts contg. Ba and V in, effect of sintering on)

L25 ANSWER 14 OF 16 HCA COPYRIGHT 2005 ACS on STN
 21:5796 Original Reference No. 21:711h-i,712a-d Tervalent vanadium. II.
 Meyer, Julius; Markowicz, Ernst Z. anorg. allgem. Chem., 157,
 211-50 (Unavailable) 1926.

AB cf. C. A. 18, 3154. The alum, NH₄V(SO₄)₂.12H₂O, was prep'd. from NH₄VO₃, and **H₂SO₄** by the action of SO₂ and elec. reduction. A concn. of **H₂SO₄** slightly less than theoretical yields blue crystals, while more dil. solns. yield red crystals. A violet modification which is probably a mixed crystal of the red and blue is also mentioned. An exhaustive study of these crystals shows no differences in properties, except color. Per cent compn., rate of efflorescence and elec. cond. (13-60.degree.) are identical. The m. p. is 49-50.degree.; d. is 1.687 at room temp.; the solv. is 28.45 g. per 100 g. H₂O at 20.degree.. The soln. is slowly oxidized by air, giving **VOSO₄**. The 2 modifications are interconvertible. Pure NH₄V(SO₄)₂.12H₂O is blue, and the red modification contains traces of **V₂O₃** or V(OH)₃ from hydrolysis. In a similar way the alum, KV(SO₄)₂.12H₂O, was prep'd., but analogous modifications could not be obtained. By slight modifications in the same method, green vanadic hydrogen sulfate tetrahydrate, HV(SO₄)₂.4H₂O, the hexahydrate, HV(SO₄)₂.6H₂O, ammonium vanadic sulfate tetrahydrate, NH₄V(SO₄)₂.4H₂O and the hexahydrate, NH₄V(SO₄)₂.6H₂O, were prep'd. A series of compds. was prep'd. from V(AcO)₃ soln. This soln. was prep'd. from a suspension of reactive V₂O₅ in AcOH by reduction with hydrazine. Addn. of fuming **H₂SO₄** to the acetate soln. yields hydroscopic penta-, hexa- and octahydrates of vanadic hydrogen sulfate. If NH₄VO₃ is used instead of V₂O₅, the tetra- and pentahydrates of ammonium vanadic sulfate are formed. Addn. of 60% **H₂SO₄** to the acetate soln. yields dark green nona- and decahydrates of vanadic sulfate. The nonahydrate absorbs H₂O from the air in amts.

which indicate the formation of $V_2(SO_4)_3 \cdot 14H_2O$. Warm solns. of the vanadic hydrogen sulfates in concd. **H₂SO₄** yield vanadic sulfate trihydrate and vanadic hydrogen sulfate dihydrate. Anhyd. vanadic hydrogen sulfate and the monohydrate are formed from hot concd. **H₂SO₄** and $V(AcO)_3$ (analytical data not given).

Distn. of AcOH from the acetate soln. contg. concd. **H₂SO₄** and subsequent addn. of pyridine yields 2 hydrated addn. compds. of pyridine and vanadic hydrogen sulfate, green $HV(SO_4)_2 \cdot C_5H_5N \cdot 3H_2O$ and yellow $HV(SO_4)_2 \cdot C_5H_5N \cdot H_2O$. Attempts to prep. normal selenates and selenate alums were unsuccessful. Addn. of seleinic acid to $V(AcO)_3$ soln. produces the following light-green hydroscopic hydrated vanadic aceto-selenates, $V_3(AcO)(SeO_4)_4 \cdot 10H_2O$, $V_3(AcO)(SeO_4)_4 \cdot 14H_2O$, and $V_3(AcO)(SeO_4)_4 \cdot 18H_2O$. The structures of the various compds. are discussed with respect to the Werner theory, and corresponding modifications in the above formulas are given.

L25 ANSWER 15 OF 16 HCA COPYRIGHT 2005 ACS on STN

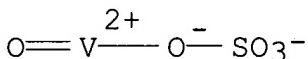
20:21615 Original Reference No. 20:2626a-b Salts and complex compounds of quadrivalent vanadium. Rosenheim, Arthur; Mong, H. Y. Z. anorg. allgem. Chem., 148, 25-36 (Unavailable) 1925.

AB Alkali **vanadyl sulfates** prepd. by dissolving alkali metavanadates in **H₂SO₄** decompose **H₂SO₄** as follows: $2VIV = VIII + VV$. The crystd. acid **V₂O₃(SO₄)₂** is obtained and crystd. salts of the formula $M_2[V(SO_4)_2]$ ($M = NH_4$, K, or Na). **Vanadyl sulfate** behaves in a similar manner. The structure of salts of the type $M_2[(VO)Ra] + aq.$ ($R =$ tartrate, salicylate radical) and the newly prepd. vanadyl hydroxynaphtholate and pyrocatecholate is similar to that of the pyrocatecholates of bivalent metals V is bivalent. Several addn. compds. with org. constituents are prepd. and a Tl salt.

IT **27774-13-6, Vanadyl sulfate**
(prepn. of)

RN 27774-13-6 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **27774-13-6, Vanadyl sulfate**
(prepn. of)

L25 ANSWER 16 OF 16 HCA COPYRIGHT 2005 ACS on STN

17:10198 Original Reference No. 17:1780d-e Vanadium from ores. Mackay, P. A. US 1450507 19230403 (Unavailable). APPLICATION: US .

AB Ores such as those contg. oxides of V and Pb are treated with fuming **H₂SO₄** and V_2O_5 is reduced to **V₂O₃** by SO_2 to obtain **vanadyl sulfate**. The soln. is subsequently dild.

with H₂O to ppt. other materials and leave the V in soln.